REFERENCES

- 1. "A Basic Asphalt Emulsion Manual", The Asphalt Institute and AEMA, Asphalt Institute Manual Series No. 19, Third Edition, 120 p.
- 2. "Maintenance Technical Advisory Guide (TAG)", California Department of Transportation (CALTRANS), October 2003.
- 3. Stroup-Gardiner, Mary and Newcomb, David E., "Polymer Literature Review," Minnesota DOT Report No. 95-27, September 1995.
- 4. King, Gayle, King, Helen, Pavlovich, R. D., Epps, Amy L., and Kandhal, Prithvi, "Additives in Asphalt", Presented at the 75th Anniversary Historical Review of the Association of Asphalt Paving Technologists, 1998.
- 5. Lubbers, Chris and Watson, Scott, "Basics of Polymers in Asphalt Emulsions," BASF Corporation Web Seminar, September 29, 2005.
- 6. "Quantification of the Effects of Polymer-Modified Asphalt for Reducing Pavement Distress", Asphalt Institute Engineering Report 215 (ER-215), 2005.
- 7. "Using Additives and Modifiers in Hot Mix Asphalt," National Asphalt Pavement Association (NAPA) Guide, 1991.
- 8. Becker, Yvonne, Menez, Maryro P., and Rodriguez, Yarjaira, "Polymer Modified Asphalt", Vision Tecnologica, Vol. 9, No. 1, pp. 39-50, 2001.
- 9. "About DuPont™ Elvaloy® RET Reactive Elastomeric Terpolymer", DuPont™ Corporation Website, Retrieved January 13, 2006 from http://www.dupont.com/asphalt/link1.html.
- 10. Ruggles, Colin S., "The Efficient Use of Environmentally-Friendly NR latex (NRL) in Road Construction Past, Present and the Future", Natuurrubber 37, pp. 2-4, 1st Quarter 2005.
- 11. Takamura, Koichi, "An Elephant, 30 Cats and 1 million Fleas How to view a Chip Seal Emulsion", BASF Corporation, Charlotte, NC, 2002.
- 12. Takamura, Koichi, "SBR Polymer Network in Chip Seal", BASF Corporation, Charlotte, NC, 2003.
- 13. Bates, Robert, "Styrene-Butadiene Rubber Latex Modified Asphalt", FAA Engineering Brief No. 39, March 2, 1987.
- 14. Takamura, Koichi, "SBR Latices for Asphalt Modification: Advantages of Fine Polymer Network Formation", Paper Presented at the ISSA Annual Meeting, Maui Hawaii, March 2001.

- 15. "Polymer-Modified Asphalt for the Paving Industry", Asphalt Institute, Information Series IS-200.
- 16. Airey, Gordon D., "Fundamental Binder and Practical Mixture Evaluation of Polymer Modified Bituminous Materials", International Journal of Pavement Engineering, Vol. 5, No. 3, pp 137-151, September 2004.
- 17. Chen, Jian-Shiuh, Liao, Min-Chih, and Siah, Ming-Shen, "Asphalt Modified by Styrene-Butadiene-Styrene Triblock Copolymer: Morphology and Model", Journal of Materials in Civil Engineering, pp 224-229, May/June 2002.
- 18. Airey, G. D., Singleton, T. M., and Collop, A. C., "Properties of Polymer Modified Bitumen after Rubber-Bitumen Interaction", Journal of Materials in Civil Engineering, pp 344-354, July-August 2002.
- 19. Serfass, J.P., Joly, A. and Samanos, J., "SBS-Modified Asphalts for Surface Dressing in Polymer Modified Asphalt Binders", ASTM STP 1108, Philadelphia, 1992.
- 20. Gahvari, Fariborz, "Effects of Thermoplastic Block Copolymers on Rheology of Asphalt", Journal of Materials in Civil Engineering, pp 111-116, August 1997.
- 21. Holleran, G., Reed Jeffery R., and Van Kirk, Jack, "Use of Crumb Rubber in Slurry and Microsurfacing and Chipseals", Valley Slurry Seal Technology Paper, 1997.
- 22. Sabbagh, Amiel B., and Lesser, Alan J., "Effect of Particle Morphology on the Emulsion Stability and Mechanical Performance of Polyolefin Modified Asphalts", Polymer Engineering and Science, Vol. 38, No. 5, pp 707-716, May 1998.
- 23. "Asphalt Rubber Usage Guide", California Department of Transportation (CALTRANS), January 2003.
- 24. Murphy, M., O'Mahony, M., Lycett, C., and Jamieson, I., "Recycled Polymers for Use as Bitumen Modifiers", Journal of Materials in Civil Engineering, pp 306-314, July-August, 2001.
- 25. Morrison, Geoffrey R., Lee, Jin K., Hesp, Simon A., "Chlorinated Polyolefins for Asphalt Binder Modification", Journal of Applied Polymer Science, Vol. 54, pp 231-240, 1994.
- 26. Yousefi, Ali Akbar, "Polyethylene Dispersions in Bitumen: The Effects of the Polymer Structural Parameters", Journal of Applied Polymer Science, Vol. 90, pp 3183-3190, 2003.
- 27. Ait-Kadi, Abdellatif, Brahimi, Brahim, and Bousmina, Mosto, "Polymer Blends for Enhanced Asphalt Binders", Polymer Engineering and Science, Vol. 36, No. 12, pp 1724-1733, June 1996.

- 28. Perez-Lepe, A., Martinez-Boza, F. J., Attane, P., and Gallegos, C., "Destabilization Mechanism of Polyethylene-Modified Bitumen", Journal of Applied Polymer Science, Vol. 100, pp. 260-267, 2006.
- 29. Morrison, G. R., Hedmark, H., and Hesp, S. A. M., "Elastic Steric Stabilization of Polyethylene-Asphalt Emulsions by using Low Molecular Weight Polybutadiene and Devulcanized Rubber Tire", Colloid & Polymer Science, Vol. 272, pp 375-384, 1994.
- 30. Hesp, S. A. M., and Woodhams, R. T., "Asphalt-Polyolefin Emulsion Breakdown", Colloid & Polymer Science, Vol. 269, pp 825-834, 1991.
- 31. Panda, Mahabir, and Mazumdar, Mayajit, "Engineering Properties of EVA-Modified Binder for Paving Mixes", Journal of Materials in Civil Engineering, pp 131-137, May 1999.
- 32. Panda, Mahabir, and Mazumdar, Mayajit, "Utilization of Reclaimed Polyethylene in Bituminous Paving Mixes", Journal of Materials in Civil Engineering, pp 527-530, November/December 2002.
- 33. Gerard, L. Champion, Martin, J. P. Planche, and Anderson, D., "Low Temperature Fracture Properties of Polymer-Modified Asphalts Relationships with the Morphology", Journal of Materials Science, Vol. 36, pp 451-460, 2001.
- 34. Uranga, Oscar G., "Rheological Properties of Bitumen Modified with Polyethylene and Polyethylene Based Blends", Universidad del Pais Vasco, n.d.
- 35. Hussein, Ibnelwaleed A., Iqbal, Mohammad H., and Al-Abdul Wahhab, Hamad I., "Influence of Mw of LDPE and Vinyl Acetate Content of EVA on the Rheology of Polymer Modified Asphalt", Rheologica Acta, 2005.
- 36. "Specifications: Polymer Modified Standard Slurry Seal", Valley Slurry Seal Website, Retrieved January 13, 2006 from http://www.slurry.com/stanspecs_polymer_mod.shtml.
- 37. "Technical Information for Ultracoat", Ultrapave Website, Retrieved January 13, 2006 from http://www.ultrapave.com/tech.html.
- 38. Turk, Johannes, and Schmidt, Marco, "Asphalt/Bitumen Modification with Elastomeric SBR Dispersions", BASF, Minsk Asphalt Conference, Sept. 6-11, 1999.
- 39. "Recommended Performance Guidelines for Micro-Surfacing", ISSA Specification A143 (Revised), May 2003.
- 40. Jones, David R., and Ng, Antonio C., "Effects of Various Polymers on Quick-Set/Quick-Traffic Emulsified Asphalt Micro-Surfacing Mixes Part I and II", 27th Annual Convention of the ISSA, Kona, Hawaii, 1989.
- 41. "Styrene-Butadiene Rubber Latex Modified Asphalt", FAA Engineering Brief #39, March 2, 1987.

- 42. "Shell sees niche for new bitumen products", Oil & Gas Journal, Vol. 95, No. 29, p. 38, July 21, 1997.
- 43. Lesueur, Didier, and Gerard, Jean-Francois, "Polymer Modified Asphalts as Viscoelastic Emulsions", Journal of Rheology, Vol. 42, No. 56, pp. 1059-1074, October 1998.
- 44. "Standard Specifications: Polymer Modified Asphalt Rubber Modified Slurry Seal", Valley Slurry Seal Website, Retrieved on January 13, 2006 from http://www.slurry.com/stanspecs_asphaltrubber.shtml.
- 45. Witczak, M. W., Hafed, I. and Qi, X., "Laboratory Characterization of Elvaloy® Modified Asphalt Mixtures, Retrieved on January 13, 2006 from http://www.dupont.com/asphalt/link5.html, June 1995.
- 46. "Specifications: Microsurfacing", Valley Slurry Seal Website, Retrieved on January 13, 2006 from http://www.slurry.com/stanspecs_microsurfacing.shtml.
- 47. Forbes, A., Haverkamp, R. G., Robertson, T., Bryant, J., and Bearsley, S., "Studies of the Microstructure of Polymer-Modified Bitumen Emulsions Using Confocal Laser Scanning Microscopy", Journal of Microscopy, Vol. 204, Pt. 3, pp 252-257, December 2001.
- 48. Takamura, Koichi, "Pavement Preservation Using the SBR Latex Modified Asphalt Emulsion", BASF Corporation, Presented at the International Latex Conference, Charlotte, NC, July 2005.
- 49. Takamura, Koichi, and Heckmann, W., "Polymer Network Formation in the Emulsion Residue Recovered by Forced Air Drying", BASF Corporation Report No. 11-004-99, June 1999.
- 50. Wegan, Vibeke, "Effect of Design Parameters on Polymer Modified Bituminous Mixtures", Danish Road Institute Report #108, 2001.
- 51. Janisch, David W., and Gaillard, Frank S., "Minnesota Seal Coat Handbook", Report No. MN/RC-1999-07, 112 p., April 1998.
- 52. Mercado, Edith A., Epps Martin, Amy, Park, Eun Sug, Spiegelman, Clifford, and Glover Charles J., "Factors Affecting Binder Properties between Production and Construction", Journal of Materials in Civil Engineering, pp 89-98, January/February 2005.
- 53. Epps Martin, Amy, Park, Eun Sug, Arambula, Edith, and Spiegelman, Clifford, "Assessment of the TxDOT Binder Quality Assurance Program", FHWA Report No. FHWA/TX-03/4047-2, 88 p., December 2003.
- 54. Takamura, Koichi, "SBR Synthetic Latex in Paving Applications", presented at Bitumen Asia 2000, June 20-21, Singapore, 2000.

- 55. Hazlett, Darren, "Superpave Specifications for Surface Treatments?", Superpave Asphalt Technology website, Retrieved on May 25, 2006 from http://www.utexas.edu/research/superpave/articles/astmart.html.
- 56. Clyne, Timothy R., Marasteanu, Mihai O., and Basu, Arindam, "Evaluation of Asphalt Binders Used for Emulsions", MN DOT Report No. MN/RC-2003-24, August 2003.
- 57. Epps, Amy L., Glover, Charles J., and Barcena, Roberto, "A Performance-Graded Binder Specification for Surface Treatments", FHWA/TxDOT Report No. FHWA/TX-02/1710-1, October 2001.
- 58. Finn, Fred N., Yapp, Margot T., Coplantz, John S., and Durrani, Amer Z., "Asphalt Properties and Relationship to Pavement Performance", SHRP Summary Report SR-ARE-A-003A-89-3, May 1990.
- 59. Walubita, Lubinda F., Epps Martin, Amy, and Glover, Charles J., "A Surface Performance-Graded Specification for Surface Treatment Binders: Development and Initial Evaluation", Texas Transportation Institute, FHWA Report No. FHWA/TX-05/0-1710-2, June 2005.
- 60. Takamura, Koichi, "Comparison of Emulsion Residues Recovered by the Forced Airflow and RTFO Drying", BASF Corporation, Presented at the AEMA/ISSA Annual Meeting in Charlotte, North Carolina, March 2000.
- 61. Desmazes, C., Lecomte, M., Lesueur, D., and Phillips, M., "A Protocol for Reliable Measurement of Zero-Shear-Viscosity in Order to Evaluate the Anti-Rutting Performance of Binders", 2nd Eurasphalt & Eurobitume Congress, Barcelona, Spain, pp 203-211, 2000.
- 62. "Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects", FP-03, Federal Lands Highway, FHWA Publication No. FHWA-FLH-03-001, 2003.
- 63. Khosla, N. Paul, and Zahran, S. Z., "A Mechanistic Evaluation of Mixes Containing Conventional and Polymer Modified (Styrelf) Asphalts", Proceedings of the AAPT,1989, and Presented at the AAPT Styrelf Week Meeting, February 1988.
- 64. Gransberg, Douglas D., and Zaman, Musharraf, "Analysis of Emulsion and Hot Asphalt Cement Chips Seal Performance", Journal of Transportation Engineering, pp 229-238, March 2005.
- 65. Takamura, Koichi, "Improved Fatigue Performance of Asphalt Emulsion Residue Modified with SBR Latex", BASF Corporation, Paper Presented at the AEMA Annual Meeting in Nashville, TN, 2003.
- 66. Shuler, Scott, "Chip Seals for High Traffic Pavements", Transportation Research Record 1259, Washington, D.C., pp. 24-34, 1990.

- 67. Wegman, Dan, "Design and Construction of Seal Coats", Minnesota DOT Report No. MN/RD-91/02, 1991.
- 68. Gransberg, Douglas, and James, David M. B., "Chip Seal Best Practices", NCHRP Synthesis Report No. 342, Transportation Research Board, 2005.
- 69. Jones, David R., Ng, Antonio C., "The Effects of Various Polymers on Quick-Set Quick-Traffic Emulsified Asphalt Micro-Surfacing Mixes", A Paper Presented at the AEMA Annual Meeting, November 1988.
- 70. Holleran, Glynn, "The Use of Polymer Modification in Slurry Surfacings", ISSA Users Workshop. Columbus, Ohio, April 96. VSS Website, Retrieved on June 2, 2006 from: http://www.slurry/.com/technology_paper_docs/polymer.shtml.
- 71. Takamura, Koichi, "Portland Cement-Free Microsurfacing", Paper Presented to ISSA, 2001.
- 72. Solaimanian, Mansour, Kennedy, Thomas W., "Evaluation of the Cape Seal Process as a Pavement Rehabilitation Alternative", Center for Transportation Research Summary Report No. 1788-S, October 1998.
- 73. Maher, Michael, Marshall, Chris, Harrison, Frank, and Baumgartner, Kathy, "Context Sensitive Roadway Selection Guide", FHWA CFLH Division Report No. FHWA-CFL/TD-0x-004, August 2005.
- 74. "Technical Recommendations for Highways: Design and Construction of Surfacing Seals", South African National Roads Agency, Report TRH3, May 2007.
- 75. "Six Steps to a Better Chip Seal", California Chip Seal Association.
- 76. Vonk, W., and Hartemink, R., "SBS-Modified Binders, Also Cost Effective in Hot Climates!", Proceedings of the 8th Conference on Asphalt Pavements for South Africa, Paper 023, ISBN 1-920-01718-6, September 2004.
- 77. Davies, E. and Laitinen, J., "A Laboratory Study into the Effects of Aging on the Durability of Modified Bitumens and Bitumen/Aggregate Mixtures", Proceedings of the 2nd International Conference on Road & Airfield Pavement Technology, September 1995.
- 78. "SADC Guideline on Low-volume Sealed Roads", Southern African Development Community, July 2003.
- 79. Hicks, R. Gary, Seeds, Stephen B., and Peshkin, David G., "Selecting a Preventive Maintenance Treatment for Flexible Pavements", Foundation for Pavement Preservation Report, June 2000.
- 80. Kucharek, Anton, Davidson, Keith, and Croteau, Jean-Martin, "Chip Sealing Systems: Improving Early Age Chip Retention", Proceedings of the 10th International Conference on Asphalt Pavements, August 2006.

- 81. Salomon, Delmar, Zhai, Huachun, Corona, Joe and Catelllanos, Frank, "New Tools to Measure Emulsified Asphalt Properties", Idaho Asphalt Supply, Inc., November 2004.
- 82. "Field Emulsion Viscosity Test", Wyoming Department of Transportation (WYDOT) 538.0, Under Review.
- 83. Kadrmas, A., "Alternative Residue Test Methods for Slurry and Microsurfacing Emulsions", Oral Presentation to the 35th Annual AEMA Meeting, Los Cabos, Mexico, February, 2008.
- 84. European Standard EN 13074, "Bitumen and Bituminous Binders Recovery of Binder from Bitumen Emulsions by Evaporation", July 2002.
- 85. European Standard EN 13808, "Bitumen and Bituminous Binders Framework for Specifying Cationic Bituminous Emulsions", May 2005.
- 86. European Standard EN 14895, "Bitumen and Bituminous Binders Stabilization of Binder from Bituminous Emulsions or from Cutback and Fluxed Bituminous Binders", April 2006.
- 87. Harnsberger and Huang, Western Research Institute, Personal Communication, 2008.
- 88. Marasteanu, M. and Anderson, D., "Time-Temperature Dependence of Asphalt Binders An Improved Model", AAPT, vol. 65, p. 408, 1996.
- 89. ASTM D7405-08: Standard Test Method for Multiple Stress Creep and Recovery of Asphalt Binder Using a Dynamic Shear Rheometer.
- 90. Kim, Y. R. and Lee, J., "Optimizing Gradations for Surface Treatment", Research Report No. FHWA/NC/2005-05, Final Report, North Carolina Department of Transportation (NCDOT), Raleigh, 2005.
- Preservation II, Foundation for Pavement Preservation (FP²), San Diego, California, November 2001.
- 92. ASTM D7000-04: Standard Test Method for Sweep Test of Bituminous Emulsion Surface Treatment Samples, American Society for Testing and Materials, 2004.
- 93. Takamura, Koichi, BASF Corporation, Personal Communication, 2008.
- 94. Barnat, J., McCune, W. and Vopat, V., "The Sweep Test: A Performance Test for Chip Seals," presented to the Asphalt Emulsion Manufacturers Association, San Diego, CA, February 2001.

- 95. Barnat, J., McCune, W., Vopat, V. and King, H., "Macro-Surfacing: An Innovative Emulsion Chemistry Surface Treatment", Congress Proceedings, Third World Congress on Emulsion, 2002.
- 96. European Standard EN 12272-3:2003, Surface Dressing test Method Part 3: "Determination of Binder Aggregate Adhesivity by the Vialit Plate Shock Test Method", 2003.
- 97. Davidson, J.K., Houston, G., Linton, P., Croteau, J.M., "An Overview of the Design of Emulsion Based Seal Coating Systems Available in Canada and Abroad", CTAA, 50, 363-377, 2005.
- 98. European Standard prEN 13588, "Vialit Pendulum Test Determination of Cohesion of Bitumen and Bituminous Binders", 2004.
- 99. Lee, J., Kim, Y.R. and McGraw, E.O., "Performance Evaluation of Bituminous Surface Treatment Using the Third-Scale Model Mobile Loading Simulator", Journal of the Transportation Research Board, No. 1958. Washington D.C.: 59-70, 2006.
- 100. Lee, J., Kim, Y.R., "Optimizing the Rolling Protocol for Chip Seals", Transportation Research Board Preprints, Washington, D.C., 17 pp, 2008.
- 101. Mouthrop, J., Fugro, Inc., Personal Communication, 2008.
- 102. King, G. and King, H., "Spray Applied Polymer Surface Seals", Project CD available from the National Center for Pavement Preservation, 2007.
- 103. Lee, J., Kim, Y.R., "Understanding the Effects of Aggregate and Emulsion Application Rates on the Performance of Asphalt Surface Treatments", Transportation Research Board Preprints, Washington, D.C., 17 p., 2008.